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Videotaping was used to analyze both video and audio components of the teaching-learning process with educable mentally retarded (EMR) children. Fifteen teachers, both inexperienced and experienced, made 31 pilot tapes, teaching one retarded and one normal child each the single, new concept of a hexagon. The 31 children included 14 EMR (ages 9-2 to 11-3), 15 normals (5-9 to 6-5), one blind, and one deaf. Results indicated that a 1.52 ratio of reinforcing statements was made by the three most successful as opposed to the three least successful teachers; teachers used an average of 429 words to 56 spoken by EMR's and 404 to 51 with the normal children, although the total average number of comments by teachers was 21.9 and 20.5 by pupils. The word hexagon was mentioned with a frequency ratio of 2.7 by teachers to pupils; the number and type of materials did not make a difference in successful teaching, although the average number used, nine, was probably too many. All teachers made more gestures than pupils; and the EMR children made more gestures than normal children. The model teaching activities used to classify and rate the videotapes rev'aled the inexperienced teachers taught closer to the criterion test items. A 30-minute test of teacher competence was generated that involved planning, performance, and ability to learn from review of own performance. (SN)

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FINAL REPORT
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AN INVESTIGATION OF SELECTED VARIABLES IN THE TEACHING OF SPECIFIED OBJECTIVES TO MENTALLY RETARDED STUDENTS

November 1967

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INTRODUCTION

Statement of the Problem

Classroom observation methods with audio tapes have utilized repeated replay to establish reliable coding, but they do not deal with the whole visual spectrum. Video taping allows for the analysis of both video and audio components of the teaching process. Although individualized "in situ" observation may record the visual components, the episodes cannot be repeated and there is a tendency to place perhaps undue importance on factors that can be reliably recorded rather than on those which might be revealed by continued replay and stop action. The advent of portable video tape recording has overcome many of the observational problems by providing a relatively simple method of permanently recording and more closely simulating classroom interaction. The technical capability of these devices allows both immediate and repetitive replay with the added feature of stop action, thus enabling more accurate recording and analysis as well as opportunities for self-appraisal by teacher and/or pupil.

With the aid of the video-tape recorder, it was proposed to study the teaching-learning process with educable mentally retarded (EMR) children and specifically attend to the interaction among three basic elements; teacher, pupil, and task. By systematically varying elements in the process the investigators hoped to isolate the extent to which each element contributed to the success or failure of pupils to learn in the teaching-learning process.

Background and Review of Related Research

The investigators were aware of the need to provide more efficient approaches to the education of retarded children and believed that the investigation would contribute to the broad problem of "What's Special About Special Education?" (5) What special teaching methods, approaches, or materials are essential to the successful teaching of retarded children? No single study can answer these two complex questions, but the present investigation was set within the general context of this endeavor. To ascertain whether exceptional children, in particular EMR's are taught differently than more intellectually endowed children, Dunn (2) voiced the need for re-examining teaching methods used in the education of exceptional children in the following statement:

> It may be that the regular loose research to date, attempting to measure the effectiveness of special education in general, is not likely to produce much new information. Rather a more fruitful approach may be to examine specific teaching methods, in more circumscribed areas of curricula, or more carefully delineated groups of children.

A review of the literature reveals one study directly concerned with the observation of classroom teaching of mentally retarded children (3). Hudson observed classroom instruction in twenty-nine classes for trainable retarded children. The technique of observation used in her study was as follows: the observers alternating every twenty minutes dictated running accounts of the interaction techniques into a tape recorder during class periods. Hudson described the information received (p. 3): "Included in these accounts were verbatim reports of what the teacher said, descriptions of teacher activities, gestures and other nonverbal interactions, and descriptions of teacher-pupil interactions. As often as possible, descriptions were given of the settings in which the behavior occured."

No comparable study has been reported with educable retarded children.

A number of research teams, most recently headed by Smith (6), Bellack (6), and Taba (7), and others have scrutinized and categorized the teaching-learning interaction. None of the approaches surveyed has, however: (1) centered upon teaching the mentally retarded child, (2) focused upon the relationship of the interaction components and certain predesigned types of learning, and (3) made full use of the newly developed recording facilities.

Smith's new approach is to stabilize the "ventures, as he has classified them, perform them, and then look for a variety of outcomes. A second strategy is proposed here: initiating the interaction with predesigned specific terminal behaviors and then study the resulting interaction. In doing so we have taken a lead from Gage and Bush at Stanford who are using video playback of small teaching episodes (micro-teaching) as a way of providing immediate critical feedback for teacher trainees. Only by concentrating upon these short 5 - 15 minute episodes which represent objectives such as the learning of a single concept does it seemingly become possible to code and classify the great amount of complex information within the taped interactions.

Another interesting technique, interpersonal recall (IPR), devised and used by Kagan, Krathwohl, and Farquhar (4) holds promise for gaining more and different insights into the interaction. Both teacher and student independently watch and respond to their performance with whatever comments seem applicable. Kagan, et. al. have had much success with this technique in counseling and are now experimenting with it using different learning situations.

More extensive review of the literature is contained in Appendix A. It includes (1) video tape studies, (2) concept formation studies with both normal and retarded children, (3) teacher-pupil interaction, and (4) studies of teacher effectiveness.

Purposes and Objectives

This study was first posed as a three year program concerned with an investigation of selected variables involved in the teaching of specified objectives to educable mentally retarded (EMR) students. Six objectives originally stated for the first phase of investigation within the proposed three year study were to:

1. test and refine techniques using videotape recorders in the natural or simulated classroom setting with educable mentally retarded students.

2. assess the ability of both teachers and mentally retarded students to introspect about their performance after viewing their videotape.

3. observe and describe differences, if any, between trained, non-trained, and experienced, non-experienced special education teachers in their ability to teach toward the attainment of a specific concept.

4. attempt to determine the overall characteristics of a successful and non-successful performance.

5. generate hypotheses regarding many facets of the interaction in terms of specific objectives which are applicable to existing classroom settings for the mentally retarded.

6. observe various aspects of the interaction in order to develop new measuring instruments now made possible by the video taping capability.

However, the recommendation of the consultants to the Handicapped Children and Youth Branch was to make no full scale comparison of various teaching methodologies until "the dependent variables used for the comparison of the methods have been fully tested and their reliability and validity established in a pilot stage." The study was funded as a one year pilot project. After careful consideration of the recommendations, the emphasis was directed toward the sixth objective above. This change in plan led to the development of instrumentation for the analysis of interaction by means of videotapes. The revised first year objectives were to:

1. refine and standardize video-taping procedures.

2. decide upon an initial task, its context and directions to be used as a vehicle for the major training and experience comparison.

3. review on-going data collection systems relevant to the task and setting.

4. generate and test unique data collection systems, unique to video-taping and the specific task and setting.

5. assess the reliability and validity of these unique systems.

METHODS AND PROCEDURES

The methods and procedures will be discussed in terms of (1) an overview, (2) first quarter activities, (3) second quarter activities, (4) third quarter activities, (5) equipment and facilities, (6) consultants, and (7) pre and post test.

Overview

As the transition was made from a projected three year study to a one year pilot investigation, the approach taken was a search for powerful variables which necessitated an initial "shot-gun" approach. Our guidelines for selection, development, search and analysis included the following:

1. Select a single concept to be taught and define the criterion behavior for concept acquisition.

2. Design teaching and evaluation procedure, teacher intent statement and self-approaisal forms and review procedure.

3. Develop video-tape techniques and studio conditions for taping teaching episodes and make pilot tapes.

4. Search literature for a more thorough review of Video-tape Studies, Concept Formation Studies, Teacher-Pupil Interaction, and Teacher Effectiveness Studies.

5. Apply several known observation scales to analyses of video-tapes and use/modify/or develop more applicable recording system as experience with the new video tape medium dictates.

6. Analyze the video-tapes for dependent variables that may be critical to successful interaction in the teaching-learning process:

a. Rewards -- type, rate and schedule used by both participants.

b. Language measures

   1. Number of words

   2. Number of comments

   3. Number of words per comment

   4. Number of words per minute

5. Type-Token ratio

6. Use of the word Hexagon

c. Non-verbal characteristics such as gestures and body movements of participants.

d. Materials -- types and quantity prepared in advance and those developed by teacher/child during teaching session.

7. Assess if teachers can objectively appraise their own performance and if they can improve in subsequent teaching sessions following video-viewing and self-appraisal. Observe discrepancies between teacher's Intent Statement and her performance as seen by teacher and by the staff.

First Quarter's Activities

The first Quarter's activities consisted primarily in tooling up and in preparing the procedures to be followed in the teaching and evaluation sessions.

1. Two Research Assistants were chosen, one to coordinate taping and analysis in Oregon, and the other to carry on a literature search in Hawaii.

2. New equipment was purchased and specialists from Ampex conducted a small workshop for the project staff.

3. A planning session, involving Investigators and Consultants was held in Berkeley, California during the Phi Delta Kappa Symposium.

4. Two members of the staff visited the Stanford University Secondary Education Project on Micro-Teaching to gain first-hand information as to the latest video-tape techniques and substantive variables of interest.

5. Eight video-tapes were made, four in Hawaii and four in Oregon, which served as prototypes for the pilot tapes which were filmed in the Spring. The purpose of these prototype tapes were three fold, a) to check technical apparatus, camera angles, sound, etc., b) to serve as models for the empirical generation of variables to be studied, and c) to provide evidence for the judgments needed to be made concerning the experimental controls, i.e. amount of time, directions to teacher and child, choice of concept, etc.

6. Arrangements were made in both Hawaii and Oregon to select both mentally retarded children and teachers of the mentally retarded to be video-taped during the project.

7. While the prototype taping was underway the Investigators surveyed the field of Video-tape Usage in Teacher Training to gain additional insight into what variables seemed to be important, i.e. Stanford University, Hunter College, Corvallis, Oregon projects.

8. A six-day session was held in Honolulu at the end of the quarter to observe the prototype tapes and a) decide upon the specific directions and controls to be implemented during the pilot video taping, b) generate and delimit potentially fruitful variables to be measured, c) decide upon procedures for assessing reliability and feasibility of these measures, d) partial out certain variables to the project staff according to their competence and interest, e) propose directions for the extension project.

9. Specific aspects of the study were parceled out to various members of the research team for particular attention and development.

Second Quarter's Activities

The second Quarter activities were based primarily on a growing awareness that existing conceptual schemes (Bellack, Smith, etc.) are comprehensive but not directly relevant to the task. The categories they chose were descriptive but not discriminating. In other words, they caught the flow but let the powerful moves go by. It was decided then to videotape many more episodes to exhaust the possible moves a teacher would make. The task then was to describe these moves and weight their importance in terms of successful post test performance.

1. Fifteen teachers participated in making 31 pilot-tapes of teaching episodes during the quarter. The number of teachers in each category was:

Experienced Regular Teacher	(3)
Inexperienced Regular Teacher	(3)
Experienced Special Education Teacher	(4)
Inexperienced Special Education Teacher	(4)
Undergraduate Student	(1)

The 31 children video-taped fell in the following categories:

14 EMR	C.A. 9-2 to 11-3
15 Normals	C.A. 5-9 to 6-5

1 Blind
1 Deaf

Copies of all tapes were sent to the consultants in Oregon for independent analyses.

2. It became more apparent as we studied Stake's evaluation model that a single performance is an inadequate measure. We planned, therefore, to assess the total domain of decisions and actions relating to the teaching of a concept. By that we sought out intent or planning decisions as well as the actual performance that ensues in order to ascertain differences between intent and performance. As the study progressed in this period we concluded that 1) not allowing the teacher to see her performance was a poor use of of the videotape machine, 2) in conjunction with watching her performance, we felt there would be value in evaluating a teacher's ability to improve her performance. Perhaps, it is the ability to learn from performance, to be aware of the feedback inherent in the task, that discriminates the trained from the untrained teacher. The procedure utilized in this quarter was as follows:

a. Instruction sheet for teachers (presented to teacher 24 hours prior to video-taping)

b. Written Intent Statement by teacher (prior to taping)

c. Written Self-Appraisal Statement by teacher (immediately after teaching)

d. Post-test of child by staff members (immediately after teaching episode)

e. Audio-taping of teacher's observations during the video-tape playback (immediately after completion of first appraisal)

f. Transcription of teaching session and audio-taping for language analysis

g. Review of video-tape by staff to observe particular variables.

3. Post test data sheets were compiled that permitted comparisons of criterion attainment by the total group E.M.R. vs. normal children and for each pair of children taught.

4. Data sheets for each teacher compared variables the teacher included as pertinent on her written Intent, written appraisal, and transcription from oral observations during playback. These statements were gathered to permit analysis of possible discrepancies between intent and action as modeled by R.E. Stake.

5. Two research assistants worked on developing an observation form for assessing reinforcement by the teacher and the child. This form was to be designed to include type, rate of reinforcement and reliability of observation.

6. One research assistant made an extensive search of observational methods of interactinn analysis (Schalock, Smith, Taba, Bellak) and to apply those coding systems that seemed most applicable and processing to an analysis of the tapes.

7. The principal investigator and the two consultants met during four days at the close of the second quarter in Oregon to discuss ongoing procedures and activities and to plan for the next quarter's areas of concentration and directions for completion of the pilot study in the final quarter.

8. One investigator was charged with developing an analysis of the teachers' language--written _vs._ oral, language used with adult, ratios of numbers of words used by teacher _vs._ number of words used by child, phrase lenghts, etc.

9. As the study proceeded we became aware of the utility of our research procedure as a meaningful way to utilize video taping as an aspect of teacher training. A Statement of this procedure was made at the CEC Convention in St. Louis in April, 1967.

10. A consultant in science education reviewed the study direction and offered constructive criticism. He was particularly helpful with several suggestions regarding Instructions for the teacher and in establishing the Post Test format.

Third Quarter's Activities

In the third quarter a record was made of the following sample of teacher behavior.

1. A written statement of the intent or plan the teacher attempted to carry out during the task of teaching a single child, either normal or retarded, the concept - "hexagon."

2. The video-taped performance (limited to five minutes) of the teacher-child interaction.

3. The child's post teaching performance assessed on a Post Test.

4. A written statement of the critique and new plan for the second trial.

5. The video-taped performance of the second trial.

6. The second child's post teaching performance.

Each section of the total behavior sample was independently assessed and, in the case of 1) and 4); or 2) and 5); and 3) and 6); difference or change scores were recorded. In summary, we examined sample planning, performing, and ability to progress from viewing one's own performance.

The basis for all behavior categorization and weighting resulted in a hypothetical model performance generated by the research group (see Appendix B for present refinement). The model generated was 1) specific to the task (acquiring the concept-principle "hexagon") and yet probably general to the large class of tasks which fall under the category of "concepts by definition," 2) elaborated the empirically determined teacher moves, and 3) provided a value for each move and sequence of moves. The values were arrived at by consensus after viewing about fifteen separate five-minute performances. The weights were used to 1) assess validity in terms of student post-task performance, and 2) signify those moves, classes of moves, and their order which we now feel are most productive. As such, the weighed values provide a bridge between behavior classification and hypothetical generatinn.

Equipment and Facilities

The Special Education Section of the Educational Psychology Department purchased a portable video-tape camera and recorder (Ampex VR-7000) and had the use of the department's observation room. A one-way mirror permitted video-taping from the adjoining room with no disturbance to the occupants. The teaching room used both low chairs for young children and standard height chairs for adults. A portable 3' x 3' blackboard was provided. The purchase of a zoom lens greatly enhanced the quality of the tapes by giving greater details of hand movements and facial expressions. On several occasions the staff borrowed a second Ampex recorder from either the Hawaiian Curriculum Center or the Communication Center for copying tapes that were sent to Oregon for analysis.

Grant funds permitted the University of Hawaii to purchase a second videotape camera and recorder (Ampex VR-6000) for the consultant and research assistants working with the Division of Teacher Research, Monmouth, Oregon. Adequate facilities for both taping and viewing tapes were available at the Research Center.

Local Ampex representatives offered technical assistance in the use of the equipment and acted as consultants in lighting and acoustical problems. Members of the professional television staffs at both the University's Communications Center and at the Hawaii Educational Television Studio in the adjoining building were helpful in offering suggestions for improving the technical quality of the tapes.

New portable quartz lights "Colortran" and a more sensitive microphone sharpened the picture contrast and improved the acoustical pick-up. The research assistants became progressively more proficient in handling the equipment and in learning the capabilities and limitations of the videotape-components.

Consultants

The investigators were fortunate to have two consultants working with the team throughout the pilot study. Three planning sessions held between Investigators and Consultants charted the research moves and reviewed quarterly progress. The first planning session met during the Phi Delta Kappa Symposium in Berkeley, California in October; secondly, the two consultants met in Honolulu with the staff early in January to review proto-type tapes and to develop procedural details and team assignments; and, the principal investigator and the two consultants met for four days in April in Oregon to discuss ongoing procedures and activities and to plan the next quarter's areas of concentration as well as the directions for completion of the pilot study in the final quarter. The consultants also directed the work of the two research assistants in Oregon and developed the observation scale.

Pre- and Post-tests

The choice, definition and criterion behavior took considerable time to iron out. "Hexagon" was chosen as a single simple concept that meets the criterion of being relevant, manageable, learnable, and still not within the student's immediate repetoire. The criterion test was developed to include both simple and complex discrimination, generalization to new examples, motoric formation and verbal rule explication.

A pre-test was generated and discarded as any test for knowledge of one of the components of the concept hexagon (six, side, figure, or label) may be seen as Teaching as well as Testing. The Pre-test was dropped as probably interfering more with the teaching facet than with helping to determine the level of pre-requisite learning. None of the children said the word Hexagon spontaneously, and one child of the 34 video-taped stated that he had previously heard the label after it was presented to him, so the concept was not in the repetoire of this population of children.

Post-test data sheets were compiled to permit comparisons of criterion attainment by the total group of EMR or Normal children and for each pair of children taught (see Appendix C).

RESULTS AND DISCUSSION

The results will be stated and discussed in the sequence of the revised objectives. There are some data to report, but for the most part the results of this study were in the form of decisions and products.

Objectives 1 and 2 - To refine and standardize videotaping procedures and to decide upon the task, its context, and the directions to be used for a comparison of training and experience.

After much discussion and viewing of classroom interaction it was decided that we focus our overall criterion test on the most representative of teaching tasks; teaching a single concept to a single child. Here was a deceivingly simple task that 1) proved to be quite discriminating, 2) involved most of the basic teaching moves, 3) was standardizable and replicable, 4) was feasible and economical, and 5) lent itself readily to the total analysis of intent, performance, and ability to progress after viewing one's performance.

Choosing the one-to-one ratio not only made the analysis operable, but also had a significant effect upon the videotaping techniques. It became possible under the tutoring conditions to videotape the entire performance of both teacher and child through a one-way glass into the cubicle usually reserved for viewing counselors and individual testing. In doing so the student was never aware of being photographed. The sound was no problem as the sensitive microphone centrally located could easily pick up the interaction within the small space. There was some difficulty using the available light; hence the light was supplemented for an excellent, sharp videotaped picture. The tapes were flown to the mainland and back for viewing and review with no loss of clarity or detail. Both teacher and student were photographed in profile from above as they worked at a low table in order to adequately view the materials and their use.

At first we were not conscious of the great need for setting a time limit on the interaction. Our first model tapes brought this fact clearly into focus as we had ranging from three to twelve minutes in length episodes. We settled upon five minutes as the maximum amount of time to be alloted and cautioned the teacher that she would be interrupted at the end of this time.

The teacher was informed of her task at least one day before her videotaping was to be done. She was directed to teach the concept, "hexagon," to a retarded child, approximately nine, in five minutes. She could use any materials she felt would be appropriate to the task and should bring them with her. There were no difficulties in these directions.

Objectives 3 and 4 - To review ongoing data collection systems relevant to the chosen task and setting, and to generate and test unique data collection systems relevant to the task and setting.

Since the number of systems for analyzing teacher-student interaction abound it was imperative that we assess measuring instruments as to their relevance for our purposes. A review of the literature led us to pay particular attention to the systems developed by Flanders, Medley and Mitzel, Gallagher and Aschner, Bellack, Taba, Smith, and Schalock. Each instrument was reviewed and, for one reason or another, rejected. The most common shortcoming for our purposes lay in the system's being reliant on audio tape transcription for classification. In using audio only, the systems were not able to classify physical moves and use of materials. Also, the time taken in transcription and categorization of the audio tapes was considered economically prohibitive. The systems which could be categorized from direct observation were not task relevant, that is, their classification scheme was still too broad to focus in on the major moves of teaching a concept, in particular to a retarded child.

Objective 5 - To assess the reliability and validity of the system generated. The discussion of reliability and validity of the system is incorporated in the discussion of the following section.

We decided to use Gagne's The Conditions to Learning as a source from which to draw this model performance. Since we had chosen a given task, it then was possible to conceive of a model teaching performance. Gagne had specified a set of optimum conditions for the teaching of a concept. These optimum conditions were based upon an exhaustive search of the research literature, thus giving his specifications empirical validity. It was our job to translate these optimum conditions into the teaching moves relevant to the concept, "hexagon." In doing so we were able to infer that our model teaching performance had "built-in," internal, empirical validity.

We had originally intended to test the "external" validity of our model by determining the effects of various teacher "moves" on the criterion performance of the child. It soon became obvious that it was possible to not follow the model and still win in the sense that the learner could perform the criterion behavior. This paradoxical element became known when a particular teacher made a number of unwarranted assumptions about the student's pre-requisite skills. In other words, the teacher did not test for these skills; the child in fact did have them and could respond adequately to her inadequate directions. The more adaptable the child the more the teacher can make inappropriate moves and still win the game, that is, score high on criterion tested. It became strikingly obvious from viewing the sample videotapes that to teach the mentally retarded, a teacher cannot make any untested assumptions about pre-requisite skills. In other words, the EMR teacher must be a more "perfect" teacher, one who makes all the right moves, to be successful in changing the child's behavior.

The final version of the model, that on which the reliability check was made, was the product of countless categorical definitions made by referring to the sample video tapes. The process was tedious and demanding but the results were rewarding. Additions and subtractions to the model were made by reference to the thirty odd tapes and their subsequent student post-test performance and from the correlative studies done on a single variable conducted simultaneously and reported after this section. The final product, the manual and scoring sheets are found in Appendix B. The manual provides detailed examples of correct and incorrect moves for each category and is hopefully self-explanatory.

Reliability Check

The reliability check of the model performance categories was carried out in the following manner: 1) Weights were given to each category so that a teacher making these moves would "pile up" points and thus end with a score representative of performance. Weights were given a) to represent what we considered to be the importance of each move in reaching criterion (in doing so we were, in effect, generating a list of hypotheses), and b) to bypass the tremendous statistical problems involved in trying to calculate a congruency of observer classification measures from a list of move frequencies. 2) The two observers viewed 29 separate tapes made in conjunction with a methods class under the direction of Mrs. Carol Cartwright and Dr. Douglas Howard of the Special Education Staff. The discrepancy between categorical judgments was quite small (only one or two moves still needed further clarification) and the scores they gave to each tape, the sum total of the weights given to observed moves correlated .92 using a Pearson Product Moment correlation. This high measure of congruency simply demonstrates the possibility, with extensive training, of achieving high classificatory congruence. The amount of time needed to bring novices to that high level has yet to be determined.

The model generated 1) is specific to the task, acquiring the concept "hexagon," and yet general to the large class of tasks which fall under the category of "concepts by definition," 2) elaborates the empirically determined teacher moves, and 3) provides a value for each move and sequence of moves. The values have been arrived at by consensus after viewing many separate performances. The weights used to signify those moves, classes of moves, and their order which we now feel are most productive are the values that provide a bridge between behavior classification and hypothesis generation. The weights were also used to make it possible to use a Pearson Product Moment correlation for the reliability check.

CONCLUSIONS AND IMPLICATIONS

The more we broke down the moves of the teacher and child, the more we realized the great complexity of the "simple" task of teaching a concept. We observed that this type of concept, concept by definition, is 1) defined by an abstract principle, 2) taught as a strategy of at least four psychomotor operations each retrieved from memory, 3) concluded by the retrieval of of a decision rule containing criterial attributes where the student must match the evidence received from the strategy probe with these attributes, and 4) a decision reached by determining whether the evidence and the rule (hexagons have six sides) are congruent.

Other general conclusions drawn from observing the series of video tapes were that: 1) The student does most of his "operating" non-verbally, that is, he must mediate the entire strategy of moves and decisions. Two related teacher moves seemed to stand out as needed: that the teacher a) demand that the student describe his task through his operations and decision and b) that the teacher do likewise in show and tell rather than just show. 2) The teachers invariably use too many materials, and present too much information too fast. They both talked and presented materials at tremendous rates not allowing the child to perceive and record any one at a time. It seemed analogous to throwing the student twelve ping pong balls at once with the scurry that ensues as he hurriedly tries to catch them. 3) There was an almost complete absence of the designation of the non-example and its criterial attributes. Rare were the occasions of statements such as "This figure does not have six sides so it is not a hexagon." Non-examples were used but given their own names, i.e. squares, but not called a non-hexagon, or dealt with as such.

An explanation of the move classifications with examples of "good" and "bad" moves such as is done in the Stanford-Binet is provided in the manual (Appendix B). The accompanying scoring sheets are specially developed as check sheets such that when placed side by side there is a minimum of scorer hand movement. This allows the viewer to concentrate more fully on the TV screen and eliminates having to replay scenes. Both recorders became so proficient that neither had to use the stop button at all during the final checking. Most observers will not reach this competency early and therefore will probably rely heavily upon this unique feature of the device.

The Total Test

The notion of using intent or planning data in the total test generated from Stake's Evaluation Model (1965). Stake described the ability to make explicit the teaching plan as a distinguishing teacher intent, and actual performance was also a discriminating behavior in classifying teachers. With little effort our test could have the teacher write out her intent or strategy for teaching the concept, thereby enabling us to analyze both the intent and performance discrepancy. The efficiency of the system lay in the fact that model performance already had been specified, thus making a series of comparisons (intent with performance, intent with model, and performance with model) feasible. (see Appendix D for Intent Statement).

It also became apparent that the videotape had another, and perhaps unique capability, that of allowing the teacher to view her own performance immediately after giving it. This technical capability led to the development of the last two parts of the total test, the self-evaluation and the second performance. The question of whether the teacher could learn from viewing her own performance became feasible. Perhaps the trained teacher is not only better in initial performance, but also can progress from viewing her strengths and weaknesses. A series of new comparisons immediately became operable, first vs. second performance, critique vs. second performance, second performance vs. the model. In summary, in the space of less than 30 minutes we can assess the teacher's ability to plan, perform, and progress from viewing her own performance. These comparisons are all made possible by the technical capabilities of videotape and the generation of the valid and reliable model performance.

Concurrent with the development of the model performance system were separate efforts to classify and quantify various aspects of the video taped interactions which we felt might be "powerful" in effecting student change and therefore maximally discriminating. The following are the methods and results of work done in the areas of 1) reinforcement, 2) language, 3) materials, 4) intent, and 5) gestures.

Reinforcement Variable

METHOD The type, rate, and number of reinforcements the teachers used with each child were observed and tabulated. Observations for two groups of teachers are presented in Table 1 with Group A representing the 3 teachers whose 6 subjects achieved the highest criterion scores in the post tests and Group B representing the 3 teachers whose 6 subjects ranked lowest on the Concept Acquisition Test.

Reinforcements included statements of 1) General Approval (i.e. "You are a smart boy.") 2) Approval of a Verbal Reply, 3) Approval of a Motor Act following teacher directions, 4) Approval of a combination Verbal/Motor Act (tracing and counting simultaneously), 5) Approval of a correct Negative Statement (i.e. "No, it is not a hexagon"), 6) Repeating the correctly presented answer verbatum (i.e. "It has six sides."), and 7) Non-Verbal acts of approval (i.e. Nodding the head.).

See TABLE 1

Results Of the total of 222 recorded reinforcements, Group A teachers made 134 and Group B teachers made 88, a 1.52 ratio of reinforcing statements of successful to unsuccessful teachers. Each of the Group A teachers made more reinforcing statements than did Group B (43, 40, 51 vs. 38, 20, 30).

An analysis of the Rate of Reinforcements per minute shows a comparable number of reinforcements for both groups during the 1st minute, Group A = 28, Group B = 29. A rate discrepancy between the two groups appears during the 2nd minute and continues throughout the remaining 4 minutes. Group A maintained a high rate of 39, 23, and 30 reinforcement for minutes 2, 3, and 4, and Group B dropped to 20, 24, 14. During the final minute of teaching Group A dropped to 14 and Group B to 1.

The greatest discrepancy between Group A (the 3 teachers whose 6 subjects achieved the highest criterion scores in the post tests) and Group B (3 teachers whose 6 subjects ranked lowest in post test scores) was in type of Reinforcement (6) Repeating the correctly presented answer verbatum. Of the total of 58 statements in this category, Group A teachers made 46 or 79.3% of the statements.

Conclusion The question is how powerful is the verbal repetition by the teacher of a subject's correct answer in terms of reinforcement? If this item were eliminated from the tabulations of reinforcement, differences in the totals for the 2 groups would become insignificant, Group A = 88 and Group B = 76, with a ratio of 1.15. Other variables may be more responsible for accounting for successful and unsuccessful performance but it appears that further investigation of the importance of Reinforcement is warranted in the continuation of this study with particular attention given to verbatum repetitions of correct responses. Repetition or restatement of a client's statement has proved very effective in counseling and it may be equally important to learning a concept. Attention might also be given to the effect of sustaining a high rate of reinforcement throughout the teaching session as the limited sample utilized here indicated a rapid "fall-off" of the reinforcements of the unsuccessful teacher.

TABLE I

RATE AND TYPE OF REINFORCEMENTS USED

	RATE OF REINFORCEMENTS												TOTAL
			Group A Teachers				Group B Teachers						
	1		2		3		1		2		3		
Reinforcements Per Minute	M.R.*	Nor.*	M.R.	Nor.	M.R.	Nor.	M.R.	Nor.	M.R.^{F}	Nor.	M.R.	Nor.	
1	4	4	3	5	4	8	2	7	5^F	5	5	5	57
2	3	10	5	3	9	9	11	0	1^F	1	5	2	59
3	3	5	6	3	4	2	9	2	3^F	3	4	3	47
4	6	2	6	5	4	7	4	3	1^F	1	3	2	44
5	3	3	3	1	4	-	-	-	-	-	1	-	15
TOTAL	19	24	23	17	25	26	26	12	10^F	10	18	12	222

TABLE I (cont'd)

RATE AND TYPE OF REINFORCEMENTS USED

Reinforcements Per Minute	TYPE OF REINFORCEMENTS Group A Teachers 1 M.R.*	 1 Nor.*	 2 M.R.	 2 Nor.	 3 M.R.	 3 Nor.	Group B Teachers 1 M.R.	 1 Nor.	 2 M.R.^{F}	 2 Nor.	 3 M.R.	 3 Nor.	TOTAL
Verbal Approval:													
General	1	-	-	-	-	6	-	-	-	-	3	-	10
Verbal Statement	5	4	9	7	9	5	9	1	2^F	2	7	5	65
Motor Act	2	7	1	-	6	4	5	4	1^F	1	1	3	35
Verbal/ Motor Act	6	3	2	2	-	-	12	7	-	-	1	1	34
Correct Negative Statement	2	-	1	3	-	-	-	-	3^F	3	3	2	17
Repeating Correct Ansr.	1	9	10	5	10	11	-	-	4^F	4	3	1	58
Non-Verbal Approval:													
Nod	2	1	-	-	-	-	-	-	-	-	-	-	3
TOTAL	19	24	23	17	25	26	26	12	10^F	10	18	12	222

*M.R. - subject 9'2 to 11'3 C.A.; M.A. 5'5 to 8'5
Nor. - normal subjects 5'0 to 7'1 C.A.; M.A. est. 5'0 to 8'1
F scores estimated from 2nd tape; original tape erased

The Language Variable Method

The audio portion of nineteen teaching sessions was recorded on a standard audio tape recorder at 3 3/4 i.p.s. A typist then typed a transcript for each of the sessions. As a check on the typist's accuracy, a research assistant compared the transcripts with the audio tapes. Numerous discrepancies were found and corrections were made by the research assistant or one of the investigators.

When the transcripts were judged to be satisfactory, one of the investigators, with the aid of a research assistant, applied a number of objective language measures to the language samples. Analyses were restricted to the first minutes of each session.

The analyses yielded the following Language Measures:

1. Number of words. The number of words used by the teacher and also by the child were counted. From these data, simple division yields the teacher-pupil ratio.

2. Number of comments. A comment was defined as the interval between interruptions or exchanges by either teacher or pupil. A comment might consist of a single word as in an answer to a question, or of many words as when a teacher gives some information and then asks a question. One comment, then, lasts from the time one person begins speaking until the other person begins speaking.

3. Number words per comment. Division of the total number of words used by the teacher (or pupil) by the number of teacher comments yields the average number of words per comment.

4. Type-token ratio (TTR). Vocabulary variety (and inversely redundancy) on the part of the teacher was measured by the TTR. The TTR is the ratio of the number of different words used to the total number used. "Total" here refers to either the first 50 or the first 100 words.

5. Use of the word hexagon. The number of times either the teacher or student used the word hexagon was tabulated.

6. Number words per minute. The rate or pace of a teaching session was measured by dividing the total number of words used by the teacher (or pupil) by the length of the teaching session in minutes and seconds.

Results

As shown in Table II each teaching episode of 5 minutes duration was a literal verbal bombardment as more than six thousand words (6588) shattered the ether during the fourteen teaching episodes, with teachers emitting approximately 8 words (7.7) to every pupil utterance. There were more than 100 words said each minute. It would appear that the teachers talk a great deal and the pupils relatively little. The teacher in each episode used an average of 429 words to 56 words spoken by the MR children and 404 words to 51 spoken by the normal children. More words were spoken "at" the retarded children (3,002) than the normals (2831), and more words were spoken by the retardates (395) than the normal (360), which can possibly be accounted for by the phenomena of more initiation verbalization yielding more response verbalization. The teacher also used more words per comment, average 21.24 against 2.8 and 2.6 words per comment by the retarded and the normal children. The teachers varied greatly in their ratio of verbalizations with teacher #3 verbalizing 22 times (22.57) to each utterance by the normal pupil, whereas her ratio was 8 to 1 (7.82) with the retarded pupil. The lowest word ratio was 4 to 1 made by the most well-trained and experienced of the teachers, #1.

One aspect of this teaching style can be shown by the relationship between the teacher and pupil comments. The teaching episodes are characterized by a relatively equal number of comments from teacher and pupil (a see-saw) with all the teachers making an equal number or slightly more comments than the pupils, but saying many more words with each utterance (average number of comments per teacher 21.9; per pupil 20.5).

The type-token ratio data reveal that for the first 50 words the teacher in every case used a greater variety of words with the normals than with the retardates, whereas this did not hold true for the first 100 word sample. For example teacher #1 decreased her ratio from .60 to .48 for the retarded child in the 50 to 100 word sample, and from .70 to .58 for the normal youngster. In fact, in thirteen of the fourteen episodes comparing the sample of the first 50 to the next 50 words, the teachers reduced the variety of their utterances indicating that novel words were introduced early and decreased as the session proceeded.

The word hexagon was frequently mentioned by the teachers (142 times for 14 sessions) and less frequently by the pupils (52 times), a ratio of almost 3 (2.7). The teachers repeated the term 84 times to the retarded pupils and 58 times to the normal pupils. One teacher, #2, did not use the term at all, whereas teacher #5 used the term "hexagon" twenty times. In general, the retarded pupils responded with the term hexagon more than the normals did, probably reflecting the notion that over repetition of the term with the retardates would enhance retention.

The great disparity between teacher and pupil words per minute is striking. Teacher #6 spoke an average of 111.2 words per minute in her 5 minute session with a retarded child; the child spoke an average of 18 words per minute. The mean number of words per minute spoken was 107 words for all the sessions with the retardates, the teacher speaking 95 times per minute to 12 remarks by the pupil. There was an average of 103 words per minute in the sessions with the normal children, the teachers averaging 92 words per minute and the pupils 11.

Are teachers aware of this high ratio of their verbalizations? Our experience would indicate they are not and that with an awareness of their verbalization ratio they will cut down on their verbalization and will increase student verbalization if given a second try. From these data the following hypotheses seem worth of exploration:

1. How teacher-student word ratios will be positively correlated with success on the criterion test. If we subscribe to the theory that the child learns best when actively involved in the task, then those teachers who encourage verbalization on the part of the child should yield superior results. This theory is supported, in the general, by studies of the straight lecture v.s. class discussion.

2. How words per comment ratios will be positively correlated with success on the criterion test. Conversely, there will be a higher words per comment ratio for the student. A large number of words per comment may mean that the teacher is providing too much information at a time and not allowing the student to interact. The teacher, in effect, may be cutting off her own feedback and not checking to determine whether or not the child understands the information.

3. There will be no difference in the performance of pupils exposed to high rate (number words per minute) and low rate teachers. Many educators would argue that a slow rate of presentation (slow paced class) is necessary for retarded youngsters. However, recent research in listening and in compressed-speech for Talking Books for the Blind suggests that the brain is capable of handling high rate auditory input and that, in fact, attention is maintained better under high rate presentation.

4. How type-token ratio (high redundancy) will be positively correlated with success on the criterion task.

The examination of the issues raised above is worthy of attention and, subject to accurate and reliable measurement, is likely to be an indicator of teaching differences. It is rather seducing to measure the readily measureable, and the above data though interesting is perhaps a side issue to the question of teaching moves. The data gathered here is directly in line with existing audio tape studies of interaction and is currently being pursued by others. It was for these reasons that we decided to reflect upon these findings and not continue this procedure in our proposed extension of this study.

TABLE II

LANGUAGE DATA FOR FOURTEEN TEACHING SESSIONS

		Number of Words		Word Ratio	Number of Comments		Number of Words per Comment		Teacher		Hexagon		$\overline{X}$ Words/ Minute		
Teacher	Student	T	S		T	S	(T)	(S)	TTR 50	TTR 100	T	S	T	S	Total
#1	MR	403	75	5.37	26	25	15.50	3.00	.60	.48	17	7	84.8	15.8	100.6
#1	N	340	84	4.04	25	24	13.60	3.50	.70	.58	6	1	68.0	16.8	84.8
#2	MR	210	33	6.06	8	7	26.25	4.71	.70	.53	0	0	42.0	6.6	48.6
#2	N	309	25	12.76	11	10	28.09	2.50	.72	.56	0	0	61.8	5.0	66.8
#3	MR	540	69	7.82	33	32	16.36	2.51	.58	.57	8	0	113.7	12.4	126.1
#3	N	429	19	22.57	10	8	42.90	2.37	.68	.43	7	4	114.9	5.1	120.0
#4	MR	486	32	15.18	16	15	30.37	2.13	.48	.57	13	7	97.2	6.4	103.6
#4	N	407	33	12.33	19	17	21.42	1.94	.66	.59	11	8	101.8	8.2	110.0
#5	MR	518	59	8.77	33	29	15.69	2.03	.74	.55	20	4	103.6	11.8	115.4
#5	N	346	49	7.06	23	19	15.04	2.57	.72	.50	12	4	81.4	11.8	93.2
#6	MR	530	83	6.38	29	28	18.77	2.96	.68	.59	18	9	111.2	17.5	128.7
#6	N	578	67	8.60	29	29	19.90	2.30	.58	.57	14	3	115.6	13.4	129.0

TABLE II (cont'd)

LANGUAGE DATA FOR FOURTEEN TEACHING SESSIONS

Teacher	Student	Number of Words T	S	Word Ratio	Number of Comments T	S	Number of Words per (T) Comment	(S)	Teacher TTR 50	TTR 100	Hexagon T	S	$\bar{X}$ Words/ Minute T	S	Total
#7	MR	315	44	7.15	17	17	18.50	2.58	.60	.43	8	2	114.5	142.2	128.7
#7	N	422	83	5.08	28	27	15.00	3.07	.78	.58	8	3	99.3	19.5	118.8
Grand Total		5833	755	129.17	307	287	297.39	37.81	9.22	7.43	142	52	1309.80	164.50	1474.3
Total MR		3002	395	56.73	162	153	141.44	19.56	4.38	3.72	84	29	667.00	84.70	751.7
Total N		2831	360	72.44	145	134	155.95	18.25	4.84	3.81	58	23	642.80	77.86	722.60
Mean MR		429	56	8.10	23	22	20.57	2.79	.62	5.31	12	4.14	95.29	12.1	107.39
Mean N		404	51	10.34	21	19	22.27	2.61	.69	5.4	8.29	3.29	91.83	11.4	103.83

Materials Variable

Method The investigators evaluated the materials the teachers used in their teaching sessions. In the instructions to the participating teachers, there are no restrictions in nor instructions for the use of materials. Analyses include comparisons of tapes in terms of 1) kinds of materials prepared in advance and 2) materials used during the presentation by a) the teacher and b) the child (see TABLE III). Tabulations include the number of examples, number of non-examples, and the number of presentations of a given item. Intra-teacher comparisons show variations in use of materials by one teacher working with a retarded and with a normal child.

Results Materials prepared in advance include 3-dimensional objects, drawings, and cut-out shapes. Of 11 teachers whose tapes were compared for materials, 3 brought 3-dimensional objects, 4 prepared drawings of examples and non-examples, 5 brought cut-out shapes. The total number of items varied from 2 to 34 with a mean of 11 items.

In their presentations the teachers employed sticks for construction, chalk and blackboard, a box of sand, paper with brush and ink, felt pens, pencils, and scissors.

There is no apparent correlation between the number and kinds of materials used in the teaching episode and the success of the subject in achieving criterion scores on the post test. Of the 3 teachers who brought cut-out shapes only and used these as their presentation, 3 of the 6 children performed well on the post tests and 3 did not. In a comparison of the teachers who used the largest number of items and most varied materials, there was again no greater facility for subjects to do well or not to do well in the criterion test because of the quantity or types of materials.

Looking at the Intra-teacher comparisons of materials employed with the retarded and those with the normal subject, we found that there was little difference in teacher approach or quantity or types of materials used. It does appear, however, that the teachers used more than nine objects per pupil and that the manipulation of materials were tangential to the task criterion, indicating that perhaps fewer materials and fewer manipulation operations are indicated.

TABLE III

DESCRIPTION OF MATERIALS USED

Teacher: N=9	Teacher Prepared in Advance				Teacher on Spot		Pupil Make	
	Retarded		Regular		Ret.	Reg.	Ret.	Reg.
A. Prepared	Exam.	Non-Ex.	Exam.	Non-Ex.				
1. 3-dimensional	4	10	4	11				
2. drawings	7	27	5	24				
3. cut-out shapes	17	25	11	18				
B. Presentation								
1. chalk					4	5		
2. ink					8	8	3	3
3. pencil					8	8	1	2
4. crayon								
5. scissors					1	1		
6. others					1	1		
Number of objects used					112	78		
Times a given object is used					100	88		
Number of different types of examples								
		(Teacher)			(Child)			
Number of times label "H" used		94	86		35	31		
Number of episodes "H" is presented		44	38					

Teacher Intent Statements, Self-Appraisal and Staff Review

Method Of the 17 persons approached to participate in a video taping study, only one declined (and incidently subsequently dropped out of the teacher-training program). The first step was to get the teacher's consent to participate and recognition that 24 hours prior to the actual taping session they would be given further directions (see Intent Statement, Appendix D). Aside from the description of the task and some information concerning their background, they were asked to simply jot down "what you intend to do in this taping session."

Following each of the 2 taped sessions, the teachers were asked to: 1) Briefly give a general reaction, 2) What steps were used in teaching the concept? 3) Did you succeed? How do you know?, 4) What can you tell us about the child? and 5) How would you characterize your teaching of the concept Hexagon?

After taping the second session and completing the above forms, the teachers viewed a replay of the taped sessions and post tests, and was requested to stop the replay and comment as they saw fit. (Their remarks were recorded on an audio tape recorder.)

Each teacher's moves were tabulated (see Appendix E and Tables IV & V) and moves were checked as being present or absent in the 1) written intent statement, and 2) the written appraisal -- a comparison was made between the checks related to the retarded vs. the normal child and 3) an independent staff tabulated moves in a review of the two post tests. The intent summary for an individual teacher is shown in Appendix E.

The teachers were grouped experienced and inexperienced, and summary sheets were constructed (see Table IV) for the experienced teachers and (see Table V) for the inexperienced teachers.. The data on Tables IV and V characterize the intent as of the teachers prior to teaching, their written self appraisal after teaching, and an independent review by two staff members. The items tabulated were derived from the criterion test as the model was unavailable at the point in the study where these data were collected.

Results The results reported here can at best be taken as rough approximation that can lead to potentially meaningful procedure. First the number of subjects was restricted for purposes of analysis to six inexperienced and four experienced teachers. Secondly, the categories examined were banned on the criterion test model initially generated and subsequently found lacking. Be that as it may, there appear two certain factors worthy of note.

Although the intent statement specified that each teacher would teach a MR and a normal, there appeared to be few instances in intent or teaching strategy where the teacher modified her approach.

An overview of the average total moves by the experienced teachers (Table IV) 26 compares to 30 for the inexperienced teachers. This would indicate that the inexperienced teachers were noted in their intent, appraisal and review by the staff as having a higher number of moves coincident with the criterion test. It is interesting to note that the discrepancy was not in statements of intent (Exp. 5.5 vs. Inexp. 5.7), but rather in review of MR tapes by the staff (Exp. 3.5 vs. Inexp. 6.8). This finding would indicate that the inexperienced teachers did in fact teach closer to the criterion test items than the experienced teachers, moreover, the inexperienced teachers (see Table V) included 5.5 items, an after thought indicated they had taught 4.5 items and as reviewed by the staff did in fact teach 6.8 items. On the basis of these findings for this small group of teachers, one would say they taught more than they thought they taught (written appraisal) or than they intended to teach. Whereas the experienced teachers (Table IV) intended 5.7 moves, after teaching, noted an average of 6 moves, whereas staff review of the taped indicated only 3.5 moves as compared to the average of 6.8 for the inexperienced teachers. The same general trend appears to be true for both the MR and the normal subjects, although the experienced teachers as appraised by the staff review, did considerably better with the normal subjects than with the MR (Table IV, MR = 3.5, normal = 5.0)

The numbers of teachers involved in each group (6 inexperienced and 4 experienced) make generalizations spurious, but the procedure of intent-teach-review-2nd intent-teach-review would seem to be a means of looking at differences in planning (intent) and performance (to model and criterion test). In addition, the profile of the individual teachers intent and performance should provide a means of analysis of individual teaching strategy that should be useful for critique purposes.

The decision made after appraising the intent data was to revise our forms for data collection to establish the compromise that would enable a free response, placed within a format that would yield usable data. Hence, the following decision:

1) We would eliminate the reaction or written recall statement that occurred immediately after teaching. The actual responses were dependent on the teachers recall and were not meaningfully related to other data we collected.

2) We would eliminate the verbal response of the teacher after review of her tapes, as the unstructured responses did not lend themselves to meaningful analysis.

3) We would now have two parallel forms (parallel to our model and each other). Form 1 -- The Intent Statement, would be given to the teacher as previously, i.e. 24 hours before teaching. Form 2 would be written response by the teacher after video tape review that elicits the response to: "If I had it to do all over again."

TABLE IV

EXPERIENCED TEACHERS
SUMMARY INTENT - APPRAISAL & REVIEW

Taped Behavior	WRITTEN INTENT	M.R.		NORMAL		Σ
		APPRAISAL WRITTEN	REVIEW STAFF	APPRAISAL WRITTEN	REVIEW STAFF	
Present shape H	3	3	2	3	3	14
Present drawing H	-	1	-	1	1	3
Label H: verbal	1	3	1	2	1	8
Label H: written	-	-	-	-	-	--
Understand components H	4	2	-	2	1	9
Verbalize rule H	2	2	-	1	-	5
Matches shape - same	1	1	-	1	-	3
Discrim. among shapes-visual	3	3	1	2	2	11
Discrim. among shapes-touch	-	-	-	1	-	1
Discrim. 3-dimensional objects	-	-	1	-	-	1
Discrim. 2-dimensional objects	2	2	1	2	2	9
Pronounce H Correctly: T	-	-	1	-	2	3
Pronounce H correctly: C	-	-	1	-	2	3

TABLE IV (cont'd)

EXPERIENCED TEACHERS
SUMMARY INTENT - APPRAISAL & REVIEW

Taped Behavior	WRITTEN INTENT	M.R.		NORMAL		Σ
		APPRAISAL WRITTEN	REVIEW STAFF	APPRAISAL WRITTEN	REVIEW STAFF	
Pronounce correctly coached	-	-	-	-	-	--
Construct H	2	2	1	2	2	9
Counts sides: T	-	-	2	1	1	4
Counts sides: C	2	2	2	2	2	10
Counts angles: T	-	-	-	-	-	--
Counts angles: C	-	-	-	-	-	--
Draws: T	1	1	-	1	-	3
Draws: C	1	1	-	1	-	3
Traces: T	-	-	-	-	-	--
Traces: C	1	1	1	1	1	5
TOTAL	23	24	14	23	20	104
$\bar{X}$	5.7	6.0	3.5	5.7	5.0	26

TABLE V

INEXPERIENCED TEACHERS
SUMMARY INTENT - APPRAISAL & REVIEW

Taped Behavior	WRITTEN INTENT	M.R.		NORMAL		Σ
		APPRAISAL WRITTEN	REVIEW STAFF	APPRAISAL WRITTEN	REVIEW STAFF	
Present shape H	3	4	5	4	5	21
Present drawing H	3					3
Label H: verbal	2	3	5	3	5	18
Label H: written	-	-	-	-	-	--
Understand components H	5	5	3	3	4	20
Verbalize rule H	1	1	2	4	4	12
Matches shape - same	-	-	-	-	-	--
Discrim. among shapes-visual	4	3	3	2	5	17
Discrim. among shapes-touch	-	-	1	1	1	3
Discrim. 3-dimensional objects	-	1	1	2	2	6
Discrim. 2-dimensional objects	4	2	3	2	4	15
Pronounce H correctly: T	-	1	4	1	4	10
Pronounce H correctly: C	-	-	4	1	5	10

TABLE V (cont'd)

INEXPERIENCED TEACHERS
SUMMARY INTENT - APPRAISAL & REVIEW

Taped Behavior	WRITTEN INTENT	M.R.		NORMAL		Σ
		APPRAISAL WRITTEN	REVIEW STAFF	APPRAISAL WRITTEN	REVIEW STAFF	
Pronounce correctly coached	-	-	-	-	-	--
Construct H	1	1	1	1	1	5
Counts sides: T	1	-	3	1	1	6
Counts sides: C	4	3	4	4	1	16
Counts angles: T	-	-	-	-	1	1
Counts angles: C	2	-	-	-	-	2
Draws: T	1	1	-	1	-	3
Draws: C	1	1	1	1	1	5
Traces: T	-	-	-	-	-	--
Traces: C	2	1	1	1	-	5
TOTAL	34	27	41	31	45	178
$\bar{X}$	5.5	4.5	6.8	5.1	7.5	30

Gestures Variable

Method Gesture is defined in this study as a bodily movement that deviates from an erect position toward the subject and/or a move that elicits the subject's attention or response.

Two research assistants studied 21 video tapes to determine the importance of gestures in the teaching-learning sequence. Tabulations included total number of gestures of the teacher and of the subject, the ratio of number of gestures of teacher to subject, the average number of gestures for one minute of the teacher and of the subject, the average for both teacher and subject per minute (see Table VI).

Results Observations indicated that all teachers made more moves than did their pupils during the teaching sessions. The M.R. children had a ratio of 1.32 gestures to those made by the normal children.

Although the number of teachers included in each comparative group is too small to yield any definitive conclusions, it may be noted that the regular teachers (experienced and inexperienced) have a higher ratio of gestures than do the special education teachers (experienced and inexperienced). The teachers in the two groups averages almost the same number of gestures per minute (5.66 Special Education Teachers vs. 5.60 Regular Teachers) but the children's average number of gestures did vary: those children (normal and mentally retarded) taught by the special education teachers averaged 3.33 gestures and those taught by the regular teachers averaged 2.95 gestures.

Because the teachers used different materials, the interaction differed according to the task at hand and a meaningful analysis of the differences is not possible at this stage. But, by controlling for materials it would be of interest to assess the importance of gestures in a comparison study by tabulating numbers and types of gestures made by the teacher and child and correlating totals with criterion scores obtained on post tests.

TABLE VI

TEACHERS & CHILDREN
THE RATIO OF GESTURES

N	CATEGORY OF TEACHER	RATIO PER MINUTE GESTURES	TCH/CHILD
4	Experienced Special Education Teacher (Total)		1.68
4	With M.R. child	1.67	
3	With Normal child	1.56	
3	Inexperienced Special Education Teacher (Total)		1.77
3	With M.R. child	1.50	
3	With Normal child	2.05	
2	Experienced Regular Teacher (Total)		2.42
	With M.R. child	2.58	
	With Normal child	2.26	
2	Inexperienced Regular Teacher (Total)		1.92
	With M.R. child	1.73	
	With Normal child	2.12	

SUMMARY

A specific task, tutoring the concept "hexagon," was selected as the focal and reference point of the study. In doing so the investigators were able to: 1) compare both teacher and student performances over a number of different video taped examples, 2) devise and weight an internally validated (from research literature) model teaching "moves" which were eventually used to classify and rate the video taped teacher's plans and moves, 3) systematically observe such performance characteristics as reinforcements, language, material usage, gestures, and teacher intent statements, and finally 4) generate a thirty minute test of teacher competence that involves planning, performance, and being able to progress from viewing one's performance.

The technical and administrative procedures of the test were standardized. The post test given to the child was continually revised until stable and valid, thus allowing for comparison of student exit behavior as well as teacher and student performance during the teaching interaction.

Continuous revision of the model teaching moves were made throughout the year until observer agreement was stable. The final reliability check on 29 separate five-minute video tapes by two independent observers was .92. This figure was arrived at by weighting the frequencies of observations in particular categories and computing a Pearson Product Moment correlation on the 29 sets of total scores. Only two relatively unimportant categories still proved to be difficult to discriminate and record.

Methods, results, and conclusions from the concentrated test of specific variables were also reported. Only the reinforcement moves proved to be systematically discriminating.

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GLOSSARY

1. Definition or principle - a dictionary type of statement giving the attributes and inferring the non-attributes of a hexagon. Ex.: A hexagon is a six-sided figure. It answers the question why.

2. Rule - a rule is more than a definition in that the student must not only make a statement concerning the attributes of a hexagon but he must tell how he determines that it is a hexagon; i.e., the rule refers to describing the operation (9).

3. Examples - these figures which meet the attribute requirements, their concreteness, complexity and number of attributes; e.g.; size, color and dimension.

4. Inappropriate question - a question will be considered inappropriate: 1) when it is out of sequence and serves no purpose at that time, 2) when it elicits a response from which the teacher can only infer that the behavior is being performed, and 3) when it asks for information not taught or inferrable from previous moves.

5. Materials - the "concretized" information, e.g. two dimension figures, ash trays, pictures, etc.

6. Move -

   Minor move - teacher initiations, both physical and verbal, made by the teacher within the major moves. These are classified and given weights.

   Major move - a subset of minor teacher moves within the total interaction, i.e., statement of task, reveiw, etc.

7. Operation - the physical and/or mental action which the person must do to make the decision of hexagon or not. It is how the decision of whether or not the example is a member of a class is determined as opposed to a definition which only implies that some action be taken. Its verbal explanation is the rule.

8. Recycle - a teacher repeats a teaching or testing move, either major or minor.

9. Sequence - the order of major moves.

10. Strategy - the overall teacher approach to how the student acquires information, i.e., expository, demonstration, or inductive, setting up conditions such that the student infers both rule and definition.

APPENDIX A

REVIEW OF LITERATURE

A. Video-Tape Studies:

A survey of the area on video-tape utilization in teacher training programs has given all those concerned renewed insights into the kinds of variables that can be observed and examined through the realized potentialities of video-tape instrumentation. Designed to serve its unique purpose, some of the difficulties and inadequacies accruing from outmoded practices in the preparation of prospective teachers might be overcome (Bjerstedt, 1966).

An experiment conducted by Fulton (1961) at the University of Oklahoma reported the feasibility of using filmed presentations over actual classroom situation in three areas of professional education. In an attempt to observe and analyze the same phenomena, two groups of students were randomly selected: one to view films and slides and the other to observe parallel lifelike situations. Results seemed to indicate that increased achievement favored the students who saw the filmed presentations rather than those who observed directly the real classroom settings. Though films, instead of video-tape recordings were involved in this study, the significant point is that "it appears to be feasible to produce single independent film sequences giving fuller treatment of separate concepts and emphasizing specific conceptual principles related to the outcomes expected from such observed assignment" (Fulton, p. 51)

An earlier investigation in Great Britain was conducted by the Institute of Education of Nottingham University. Daniels (1959) reported four groups of high school students were taught a science study area through a differentiated method of instruction. One group viewed a television lesson, another heard only the audiotrack of the video-taped lesson, still another group worked in a conventional science lesson. A fourth group that received no form of instruction served as the control group. Findings revealed a nonsignificant difference between the methods employed. It was concluded, however, that some form of teaching was preferred than no instruction at all.

Of the comparative effect of television and conventional type of instruction on pupil achievement, Tanner (1961) observed that 90% of the comparisons made in 281 investigations yielded insignificant differences. It was noted, however, that the studies were mainly limited to achievement. No attempt was made to compare the efficiences of three instructional methods was made by Gulo (1966). Subjects were randomly assigned to three experimental conditions. One group worked through a programmed text, a second group read the verbatim material in the conventional textbook format, and a third group observed a video-tape recording of the same programmed material. A post test was administered to each group immediately after each teaching session. Negligible differences were observed in the three methods used.

Despite the fact that the revealed findings failed to favor any one particular type of instructional method, there appears no evidence to support the inferiority of video-tape utilization to other forms of conventional teaching instrumentation.

Doverspike (1963), in an attempt to improve the training of guidance personnel, used closed-circuit television in the Guidance Laboratory of the University of Akron. The trainees were given the opportunity to observe the non-verbal nuances in the behavior of counseling participants while simultaneously hearing the dialogue. Underlining features noted include: (1) the group critique period following the tape playback, and (2) the attempt to improve observation skills through the use of a checklist in a comparably controlled situation.

At San Jose State College, the investigators (Rogers and Lewis, 1963) attempted to reduce the amount of in-person observation necessary for prospective teachers through the use of controlled television. Five groups of education students randomly selected to participate in the project over a continuous period of five semesters. Three experimental groups, provided with video-tape observation experiences also made varied amounts of direct classroom observations ranging from 25% to 75% of the total hours. Comparison of these groups with their control counterpart, having no television experience indicated that controlled televiewing with limited amount of in-person observation. This was found valid for all the groups whether or not 25%, 50%, or 75% of the total scheduled observation had been carried out through controlled television.

A related study was conducted at Hunter College (Stoller and Lesses, 1963) comparing three techniques of classroom observation of pre-service teachers. It was assumed that different observation procedures would result in a concomitant difference in the degree of learning. The methods compared were: classroom observation through the use of kinescope recording, closed-circuit television, and direct observation in the classroom. Findings revealed a negative superiority for any one particular type of classroom observation. A subjective reaction of the participating student-teachers and supervisors, however, favored the use of video-tape recording with on-site observation.

A parallel approach into the utilizatinn of video-tape in teacher education is currently being investigated at Stanford University, a leading force in this innovation (Allen and Young, 1966). Two major experimental projects are described. On the one hand, they are examining the efficacy of such basic equipment as portable video-tape recorder, cameras, and audio-gear mounted on a cart. They compose an easy-to-install unit which enabled the recording of a variety of classroom learning experiences for effective use in discussion and analysis of teaching techniques and classroom interaction for teachers in training.

The second aspect of the project called the "Micro-Teaching Study" developed by Allen and Fortune (1966) describes an apparently new trend in the graduate teacher education program. Serving as a transition stage between course work and intern teaching, a student is video-taped while teaching a specified lesson of about 15-20 minutes in length to a group of five participating "students" who, in turn, evaluate the episode. The playback viewing of the tape enables the student-teacher to personally appraise his own teaching and to go over it with his supervisor. This approach draws back from the work of Fuller and Veldman (1963) who used tape recordings on the self-evaluation of student-teachers of their teaching teaching performance. After a brief period, the student re-teaches the same lesson to another group of "students" this time, with a renewed effort to improve over his first attempt. Finally, as he embarks on his intern teaching, video-recordings are again made of him "in action" while engaged in a series of teaching episodes. Initial results of this innovative approach indicated a high correlation between success in micro-teaching and successful performance in an actual classroom setting. The findings also suggest that video-recordings of student performance projects "a reliable, objective, and immediate picture of the actual teaching situation" (p. 8). At its dynamic best, video-tape recordings provide insight into the possible development of an "observation schedule" to describe and evaluate teacher-pupil behavior as well for subsequent analysis of the teaching-learning task.

A method of comparing direct observation and video-tape observation has been investigated in a project conducted at the University of Hawaii. Jenkins (1966) demonstrated the potential validity of video-taped recordings in the development of observation skills among prospective teachers. Sophomores in an introductory elementary education course were randomly divided into experimental and control groups. They followed a sequence of experience involving a four-week period of direct as well as video-taped observation of fifth-grade pupils at the University Elementary School. The observational design was then reversed such that all groups observed the same children both ways. Results of this study revealed a non-significant differences between the methods employed for developing observational acuity. The potential efficiency of video-recordings was disclosed with the suggestion that "with more careful planning and with some modification of the pattern of observation, a combination of video-tape and direct observation should prove to be superior to present methods of observation and should result in more effective instruction and more efficient use of both instructor and student time" (p. 82).

Among many other other investigators interested in the use of video-tape recordings in the preparation of teachers in training are Frederick Cyphert of Ohio State University, John Meier of Colorado State College, and W. Dwayne Belt of Brigham Young University (AERA, 1967).

B. Concept Formation Studies:

A seemingly few studies to determine the procedures involved in concept formation have been attempted by some investigators.

Carroll (1964) recognizing the paucity of literature on concept teaching, tried to give a comprehensive treatment of the task. He pointed out two relevant elements: (1) "the attributes which are criterial to the concept... and (2) the information-handling task required of the subject in view of the order in which positive and negative instances are presented and the amount of information concerning the concept" (p. 189). Strategies pointed out for managing the information load toward the attainment of the concept involves either the discovery method of instruction or some form of exposition.

An exploratory analysis of these modes of instruction was conducted by Scandura (1964) in some problem solving situations. Three aspects of the abstract material employed were identified in three separate studies on intellectually gifted students. Two groups representing the two methods were formed. The Expository (E) group received direct verbal and illustrated information relevant to the solution of the problem. In the Discovery (D) group, totally helpful information was withheld prior to the performance of the task so that subjects had to abstract on their own. Analyzed results from tape transcriptions revealed a lack of definitive evidence to support the superiority of any one particular medium of instruction. However, it was indicated that efficient concept learning was facilitated when information "was presented directly and meaningfully at a point in time when subject feedback indicates good prerequisite comprehension. Apparently, when prerequisite learning is inadequate, indirect information (given the Discovery group) is of little value (p. 155). Prior experience, then gives structure to prerequisite learning which later facilitates the child's acquisition of new concepts more readily. Equipped with information-processing modes labeled by Bruner (1964) as enactive, iconic, and symbolic representations, the child can build generalizations which he may use to novel or familiar objects in an entirely new setting.

Related to learning by discovery, Wittrock (1963) verified his hypothesis that "when retention and transfer to similar examples are the criteria, giving rules is more effective than not giving rules" (p. 185). The rôle of verbal stimuli in concept formation greatly supported the results of the study. The group that received the minimum amount of direction did poorly on initial learning as well as in retention and transfer. A similar trend was established by Guthrie (1967) in his attempt to determine the role of discovery in retention and transfer in a cryptogram deciphering task. On the retention test administered to 72 college seniors, it was revealed that the Rule-Example group obtained significantly high scores than all the representative Example-Rule, Example, and No-Training groups. This finding, however, took the reverse direction on the transfer test in which the Example group was found superior to all the others. The rest of the groups performed equally well on both tests. It was concluded that "the discovery effectiveness of both positive and negative instances in presenting equal information in a concept attainment task. Their finding revealed a more efficient concept learning with positive rather than with negative instances.

Bruner, et. al (1956), on the other hand, in identifying the instances as exemplars and nonexemplars of the concept, tried to control the presentation of the instances in their study. Their subjects tended to observe appropriate rules in their attempt to maintain or change their guesses according to the current or previous information transmitter.

Cahill and Hovland (1960) in their study of memory in a concept attainment task showed that the sequential and simultaneous process of presenting instances was far better than the successive method.

Bourne, et. al. (1964) studied further the effect of simultaneous stimulus presentation and successive stimulus presentation. It was found out that the availability of stimuli improved the performance especially in complexed problems and consequently, the major effect of simultaneous stimulus presentation in concept learning was the reduction of memory errors.

Examining the effects of the quantity of positive and negative instances on verbally-oriented concept attainment task, Mayzner (1962) grouped 144 students into 12 different experimental conditions. Analysis of results showed that with increased numbers of positive instances there occurred a rapidly more significant concept attainment than with more instances of negative examples. Therefore, less rapid learning of the concept is produced in this particular case. A consistent result was also found by Yudin and Kates (1963) in their attempt to correlate concept attainment efficiency and strategy to adolescent development and method of presentation. The focus (positive) instance appeared to have resulted in more efficiency in the performance of the task.

Relevancy and irrelevancy of information as affecting conceptual learning have been delved with and reported in many recent studies.

In Archer's (1962) study of concept identification as a function of obviousness of relevant and irrelevant information, the dimensions of form and size were used to test the hypothesis that "the obviousness of information is a manipulable variable and that such a characteristic of the information affects concept identification; that obviousness and relevance interact significantly, that is, if the relevant information were also obvious, the concept should be easier to discover than if the information were obvious, the concept should be more difficult to discover than if the information were less obvious" (p. 616). Students from the introductory courses in psychology at the University of Wisconsin totalling 128 acted as subjects. Significant results supported the predicted interaction between relevance and obviousness.

In another investigation, Schvaneveldt (1966) studied the interaction of a number of relevant stimulus dimensions and the probability of positive instances on performance in concept identification. The overall effect of the probability of positive instances was significantly noted.

From the data collected and checked regarding relevancy and irrelevancy of concept dimensions, there appears to be a consistent agreement among investigators on the general inverse relationship between the number of irrelevant dimensions in the stimuli and the efficiency of concept identification (Battig and Bourne, 1961)

Another variable to consider in concept formation is labeling. Stern (1965) presented a study purporting to investigate the role of verbalization as well as the type and amount of instructional materials in acquiring proficiency in concept learning. Two levels of labeling and three levels of variety were tested on six experimental groups of kindergarten and first-grade children. Analysis of the results indicated a significantly superior learning and transfer among first grade children trained in labeling. In terms of variety in concept identification, the intermediate variety of six instances of four concepts proved to be the most effective while the two-concept of twelve instances was the least effective in learning. This finding failed to support the assumed differences predicted by Marascuilo and Amster (1966) in their effort to determine the effect of variety and their interactions on the learning of a mathematical conceptual task. It was indicated, however, that the effect was significant for the subjects in the lower socio-economic status (SES) level.

With regards to feedback as a variable in concept formation, a study was made by Wallace (1964), which reported the comparative effect of two types of feedback, namely, verbal comments and auditory signal. The results of the investigation on 180 subjects seem to demonstrate that the type and intensity of feedback affect the performance of the subjects. It was clearly indicated that feedback following a student's response holds not only informational but motivational potential as well.

Other studies concerning feedback (Morin, 1955; Pishkin, 1960); Johannsens, 1962; and Bourne, 1963) tend to show that misleading information (misinformative feedback) given to students confuses them and retards concept learning especially with difficult and complexed materials.

Reinforcement, for one, is reportedly of significant factor in concept. Siegel and Goldstein (1959) state that a student's own feelings of positive and negative reactions to learning and the teacher's application of reward and punishment affect concept learning to a great degree especially if the teacher gives a steadily high level of reinforcement.

General findings in concept formation have been helpful in reshaping the guidelines for concept teaching. Variables involved are numerous and the above review encompasses but a few.

Concept Formation in Mentally Retarded Children

The marked incapacity of mentally handicapped children in concept formation tasks has generated some attempts toward achieving new additional insights into this skill area.

Rossi (1963) compared the performance of 180 equally grouped institutionalized retarded and normal children on a word-recall task in his attempt to determine the development of verbal mediation. A randomized stimulus list of 20 words representing four conceptual categories was presented orally to each subject for free verbal recall. Results indicated that the normal children, as expected, formed more word clusters that increased over a number of five trials. Also, a positive relationship between M.A. and recallability was significantly established.

Stedman (1963) presented a random series of 30-word pairs of six categories to both his normal and retarded subjects in an attempt to investigate associative clustering. After the presentation of the series to individual subjects, each was instructed to recall as many word-pair as he could. Results showed a positive clustering of semantic categories. As in Rossi's study, the normal subjects recalled more word-pairs and clustered significantly more often than their retarded counterparts who produced a qualitatively different recall process.

Stephens (1964) worked with both educable mentally retarded children and normal boys matched for CA to compare their ability to identify items representing 25 categories. The performance of the retarded group was found to be significantly inferior to that of the normal group.

In a replicate study of Furth's earlier investigation, Milgram and Furth (1963) studied the effect of language ability on a principle discovery task. EMR and normal subjects of "Sameness," "Symmetry," and "Opposition" tasks. Prior to the presentation of the task, motivational readiness was established among the subjects. Results revealed that the EMR children performed more efficiently than the normal children on non-verbal tasks. On language-oriented tasks, however, they showed an inferior ability. The writers concluded that "failure on the discovery task stemmed from inability to summon up available concept knowledge rather than from absence of this knowledge" (p. 734).

Matthews, and Reitan (1963) attempted to compare the performance of two groups of mildly retarded subjects on the' Halstead Category Test and one dimensional psychological tests that required problem-solving ability, on the one hand, and experiential background, on the other hand, for successful task achievement. Intergroup comparisons within the problem-solving range revealed that the group with good abstraction ability scored significantly higher than the group with poor abstraction ability. An opposite trend was noted, however, on the test continuum calling for experiential background.

In a study of productive thinking in terms of verbal measures, Tisdall (1962) reported a nonsignificant difference between the performances of special class EMH and normal subjects. A similar finding was revealed for these two groups and a third representing the regular class retardates on two nonverbal measures. The means for the regular class retarded subjects on three verbal scores were significantly inferior to those found for the normal and special groups.

Penny and McCann (1962) investigated the training effect of repetitive presentation of stimulus words to a group of retarded subjects who gave out a different word as a response to a prior instruction. The results of this training were compared against a second set of word-association test and on Guilford's Unusual Uses Test. As a consequence of training, findings favored the experimental group with an increased number of original and unique uses produced than their matched pair. On the post training set of word-association test, however, no significant difference was noted between the two groups.

The bulk of Rouse's (1965) study pertains to the efficacy of a special training program in the development of verbal and nonverbal productive thinking among educable mentally retarded subjects. Results indicated a significantly higher mean scores obtained by the experimental group who received the training. The control group performed significantly inferior on both verbal and nonverbal subtests of Torrance's Minnesota Test of Creativity when administered as a measure of the training efficiency.

Zigler and de Labry (1962), in considering reinforcement conditions, studied the concept-switching performance of middle-class, lower-class, and institutionalized retarded children of roughly equal M.A. They discovered that mentally handicapped and lower-class children responded more effectively to a tangible rather than an intangible reinforcer. In comparison to their middle-class under the intangible reinforcement condition, there was no significant difference noted.

Evans (1964) expanded Rossi's study and explored both intelligence and material incentive variables as they relate to word-recall and associative clustering tasks. Adult male retardates were grouped according to high and low IQ and were then subgrouped into two incentive conditions. On group received material rewards while the other group received nothing at all. Individual subjects were presented the stimulus list of words employed in the Rossi (1963) study and were later asked to recall as many words as possible. This procedure draws back from the work of Rossi (1963) and Stedman (1963) cited somewhere. It was reported that subjects of higher IQ achieved better than the subjects of lower IQ. The effect of material incentive was statistically negligible. However, the material incentive and the duller groups tended to evoke more unqualified responses than their more abled pairs.

Baumeister, Beedle, and Hawkins (1963) compared the performance of normal and institutionalized children of matched MA levels involving a transposition task under varying training and test conditions. They found no significant difference between the two groups.

C. Teacher-Pupil Interaction:

A systematic review of the literature reveals a number of studies and approaches to the analysis of classroom interaction. The "observational schedule" used include the merged cognitive-affective and multi-pronged areas of teacher-learner behavior. Significant variables examined encompass teaching procedure, pupil achievement, emotional climate, personality, role expectations, teacher-information processing functions, teacher retrievable information, and other patterns present in the teaching learning act.

In the attempt to obtain reliable data for observing and recording teacher-pupil interaction in the classroom, various techniques and instruments have been developed.

In an effort to obtain an accurate measure of the distribution of face-to-face contacts between teacher and pupils and get a complete view of the interaction, Withall (1956) described the use of an automatic time-lapse camera. This instrument photographically recorded the pupils who were encompassed by an imaginary circle around the teacher within a radius of approximately one yard. The time-lapse pictures were automatically taken every 15 seconds and with an audio-tape recording made to synchronize the shots. This technique, however, although it reduces the number of judges, presented no evidence on reliability or validity.

Howsam (1960) described the development of kinescope techniques for recording the actual on-going teaching-learning interaction as they happen in the classroom. The recordings are useful in trying out preliminary forms, in training observers, and in establishing reliability checks.

Flanders (1963) devised and described a 10-category system of "interaction analysis" which focused on the verbal behavior pattern of teacher and pupil in the transactional classroom setting. The matrix analysis provides a fairly reliable record and assessment of the direct and indirect influence of the teacher's talk, as well as the students' talk, characterized as responding to or initiating behavior. This observational system evolved an operational definition of teacher's classroom behavior, a need expressed by Medley and Mitzel (1960) in their attempt to study teacher effectiveness in relation to some teacher-behavior variables. Concomitantly, there emerged a system of quantifying the behaviors as observed in a dynamic process of classroom interaction. As a data gathering tool, the technique of interaction analysis helps prospective teachers in comparing their teaching intents with their performance after having gained a feedback information.

A similar focus on verbal interaction yet on a different phase was studied by Bellak, et. al. (1963). The major task of identifying the category of linguistic behavior of teachers and students in the actual classroom was captured through tape recordings. Data analysis was made through verbatim transcriptions of what happened during the class in action.

Smith's new approach is to stabilize the "ventures" as he has classified them, performed them, and then looked for a variety of outcomes. A second strategy is proposed here: initiating the interaction with predesigned specific terminal behaviors and then studying the resulting interaction. In so doing, the investigators have taken a lead from Gage and Bush at Stanford whose video play of small teacher episodes (microteaching) is used as a way of providing immediate critical feedback for teachers in training. Only by concentrating upon these short 5-15 minute episodes which represent objectives such as the learning of single concept does it seemingly become possible to code and classify the great amount of complex information within the taped interactions.

Another interesting technique, interpersonal recall (IPR), developed and used by Kagan, Krathwohl, and Farquhar (1965) holds promise for gaining more and different cues into the interaction. Both teacher and student independently watch and respond to their performance with whatever comments seem appropriate. Kagan, et. al. had had much success with this technique in counseling and are now experimenting with it using different learning situations.

The instrument-developing efforts of the research teams have scrutinized and categorized the patterns of the teaching-learning interaction. None of these has, however: 1) centered upon teaching the mentally retarded child; 2) focused upon the relationship of the interaction components and certain predesigned types of learning, and 3) made full use of the newly developed recording facilities. Nevertheless, they do provide some excellent cues to an understanding of the teaching-learning process of exceptional children.

In this connection, a study directly concerned with the observation of classroom teaching of mentally handicapped children however, was initiated by Hudson (1960). A technique for observing classroom instruction in 29 classes for trainable retarded children was described as follows: the observers alternated every twenty minutes dictating flowing accounts of the interaction process into a tape recorder during class periods. The information received included verbatim accounts of the teacher's utterances, descriptions of teacher initiated activities, gestures, and other nonverbal interactions, and descriptions of teacher-pupil interactions.

There has been no similar study reported with educable mentally retarded (EMR) children.

D. Teacher Effectiveness:

In an attempt to define and evaluate teacher effectiveness in teaching concept to children of different IQ and age levels in a one to one relationship, the investigator has reviewed a representative survey of the literature relative to the area. It was discouraging to note that there seemed to be a dirth of materials on the subject and so far, no objective criteria for measuring teacher effectiveness have yet been evolved and used in the field.

Soar (1964) points out the very inadequate research made so far on prediction and assessment of teacher effectiveness. It is felt that because of the subjectivity involved depending on the individual's value judgment, many inconsistencies occur on the observations made on classroom teaching and consequent pupil learnings. However, attempts have been made which seem promising, on reaching the goal of measuring and identifying effectiveness of teaching in terms of pupil growth and learning. The implication relates to improved teacher training as a result of deeper insight into the teaching-learning process.

Searching for a way to measure classroom teaching effectiveness, Hayes (1963) conducted an experiment to a sample population of 660 male undergraduates at the Pennsylvania State University. The experiment appears to have achieved the purpose of developing a unidimensional instrument of nine attitude items to measure teaching effectiveness. Using the Cornell scalogram analysis procedures to test for unidimensionality, the study also indicated that the students' attitude towards a required course did not in any way affect the ratings given instructors by the students. A replication of the study at the collegiate and secondary levels to evolve a really objective and beneficial evaluation of effective teaching was greatly encouraged.

Earlier, Ryans (1949) discussed in his paper on "The Criteria of Effectiveness in Teaching" smme possible approaches to the problem of a need for "better defined and validated criteria of effectiveness in teaching." He proposed two possible criteria, namely, 1) ratings of teacher ability and 2) measurements of pupil change. He hoped that subsequent studies on the topic may provide a profile which may be useful in teacher education and training.

In 1965, Chung-Phing Shim published a study on the effect of four characteristics of teachers on the achievement of elementary school pupils. The four teacher variables were: college grade-point average (GPA), degree, certification, and experience. Results indicated that the selected teacher variables failed to show any effect on pupil achievement.

The need of a shift in thought in teacher education was brought about in a study conducted by Flanders (1963). Using interaction analysis as a research technique to a group of 55 participating teachers judged on a ten-category scale, the findings greatly implied that teacher education need to de-emphasize knowledge-getting techniques for effective teaching but to delve more on an analysis of teaching acts as they occur in spontaneous classromm interaction. In teacher training institutions demonstrating rather than talking about effective teaching should be emphasized to help would-be teachers "learn to control their own behavior for the professional purpose of managing effective classroom learning." (p. 260).

In this connection, Ryans (1963) published an article with an extensive overview of the status of teacher behavior research and theory and their implications for teacher education. Based on a frame of reference of what teacher behavior is, he proceeded in presenting and discussing a synthesized classification of selected research findings on the topic, some facts and generalizations concerning teacher behavior as it affects teacher effectiveness, and some implications of research findings and

and theories to teacher training programs for maximum positive results in teacher education.

All in all, in so far as the review was conducted, there appeared to be no comparable study on the differentiated effectiveness between special education and regular teachers with similar experience and training.

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Appendix B

MODEL PERFORMANCE SCORING SHEETS

II Preliminary Moves

5	A.	Statement of the Task: Any statement by teacher with an example telling the child what he will be able to do.
5	B.	Assessing Motivational Readiness: Any question which asks the child if he wants to, is ready to, learn.

III Testing Prerequisite Tasks

5	A.	Name "Hexagon": Any check and teaching of word "hexagon".
5	B.	Verbal Chain of Definition: Any check of student being able to repeat definition.
5	C.	Verbal Chain of Rule: Any check of student being able to repeat the rule.
5	D.	Psycho-Motor Operation: Any check of student being able to complete the entire operation.
5	E.	Operation and Rule Together: Any check of student being able to say rule and do operation together.

IV Pre-testing Moves

Prerequisite Concepts

VI Post-testing Moves

A. Initial Test of Concept	B. Test Concept of Six	C. Test Concept of Side	D. Test Concept of Shape or Figure		Test Hexagon After Teaching
5	5	5	5	1. Teacher asks child to identify both an example and a non-example when given objects either singly or in a group.	5
5	5	5	5	2. Teacher asks child to identify an example but no non-example.	3

IV Pre-testing Moves

VI Post-testing Moves

	Prerequisite Concepts				
A. Initial Test of Concept	B. Test Concept of Six	C. Test Concept of Side	D. Test Concept of Shape or Figure		Test Hexagon After Teaching
				3. Teacher asks child to identify second set of example and non-example.	3
				4. Teacher asks child to identify only an example of the second set of example and non-example.	1
3	3	3	3	First Bonus: Teacher asks child to state rule while identifying. (How do you know?)	3
2	2	2	2	Second Bonus: Teacher asks child to state definition while identifying. (Why is it?)	2
1st	2nd	3rd	4th	Teacher asks any question which would result in child saying:	
3	3	3	3	6. Rule alone	3
2	2	2	2	7. Definition alone.	2
1	1	1	1	8. Either name or attributes alone.	1
				First Demerit: Teacher presents more than one object at a time without having taught the child where to start.	-2

I Sequence of Major Moves

10	A.	Test concept Statement of task Assessment of name, six, and side Teach Test
8	B.	Statement of task Assessment of name, six, and side Teach Test
6	C.	Assessment of n name, six, and side Teach Test
4	D.	Statement of task Teach Test
2	E.	Test concept Teach Test

V Teaching Moves

VII Review

A. First Example	B. Second Example	C. First Non-Example	D. Second Non-Example		Review: Teach After Test
5 3	2 1	5 3	2 1	Teacher has child or Teacher construct, or trace, or point to sides & count, or write numbers & teacher states definition.	5 3
				Bonus for above moves;	
3		3		Third Bonus: Teacher asks for child to say rule or definition rather than state it herself (Inductive)	
3	3	3	3	Fourth Bonus: Either teacher or child states rule instead of definition	3
3				Fifth Bonus: Teacher places one finger somewhere on object to anchor childs tracing	
				Demerits relating to above moves:	
-2	-2	-2	-2	Second Demerit: Teacher presents more than one object at a time.	-2
-3				Third Demerit: Teacher fails to have child state definition at least once.	-2
-3				Fourth Demerit: Teacher fails to have child state rule at least once.	-2
Repetitions:					
1st	2nd	3rd	4th	Teacher simply states with or without objects:	5th
3	3	3	3	Rule	3
2	2	2	2	Definition	2
1	1	1	1	Name or attributes	1

MODEL PERFORMANCE MANUAL

Introduction

The purpose of this rating sheet is to investigate teacher-EMR student interaction within the teaching-learning process. The teacher is rated as to the statements, actions and sequence of moves incorporated to teach a student a given concept.

The project is designed to be used with a video-tape recorder because of the rapidity with which the process flows, for without the opportunity to stop the tape and score each statement and action made by the teacher, it would be impossible to score the teacher accurately. The method used to score the situation is done by viewing the tape two times. The first time the tape sequence is viewed in its entirety to give the scorer an opportunity to gain an overall view of the teaching-learning situation and allow him to score division I, the Sequence of Major Moves. The second viewing is done with as many stops as necessary to accurately score the statements, actions, and sequences incorporated by the teacher.

The scoring is done by placing a small check over the appropriate number in the scoring number.

The rating sheet is divided into seven major divisions.

I. Sequence of Major Moves

This division of the rating sheet is scored while viewing the tape through the first time without any stops. The teacher is scored on the sequence which she follows in teaching the child the concept of a hexagon.

II. Preliminary Moves

Scoring in this division is done if the teacher states the task to the student and assessess his readiness to enter into the teaching-learning situation.

III. Testing Prerequisite Skills

Scoring in this division is done if the teacher uses any statements and actions to test the students Prerequisite Skills. The prerequisite skills are the student's ability to say 'hexagon', to repeat the verbal chains of the definitions and the rule, and to complete the psycho-motor operation.

IV. Pre-Testing Moves

Scoring in this division is done if the teacher uses any statements and actions to test the student's knowledge of prerequisite concepts which will be necessary for him to have before he can learn the concept of hexagon. An initial test of the concept should be done by the teacher to determine if the student already knows what a hexagon is. Then the teacher should check the student's knowledge of the concepts of six, side, and shape or figure. If the student does not know the concept of six then it will be impossible at this time to teach him the concept of hexagon.

V. Teaching Moves

Scoring in this division is done if the teacher uses any statements and actions to teach the student the concept of hexagon.

VI. Post-Test After Teaching

Scoring in this division is done anytime after the student is asked a question after being taught with the exception of the inductive teaching.

VII. Review: Teach After Test

Scoring in this division is done only after Teaching Moves and Post-Testing have been done. The statements can be checked more than once in this column since it is a recycling and review process.

Bonus and Demerits.

Because the student understanding of the concept is increased through the repetition of the rule, definition, and name or attributes, bonus points are given for statements or questions by the teacher concerning these reinforcers.

Because certain statements, actions, or questions by the teacher serve to decrease the learning of the concept by the student, points are taken away each time they occur.

Acceptable and Non-acceptable Statements

The directions booklet gives examples of acceptable and non-acceptable statements which could be given by the teacher. Statements given or similar statements will be scored accordingly. Statements which are non-acceptable will usually be of the following types:

1. Any question requiring a yes or no answer.

2. Any question in which the child answers by nodding head.

3. Teacher asking two questions in a row.

4. Teaching using words or sentences that are too difficult for the student to understand.

5. Any statement by the teacher without looking at the child and/or the child being non-attending.

6. Anytime the teacher asks for a verbal definition rather than pointing to or giving the student an example.

7. Asking the student to spell 'hexagon'.

I Sequence of Major Moves

It is felt that a teacher should follow a sequence in the teaching of a concept to a student. There are five sequences given which rank in descending order of value. The video-tape is viewed through two times, the first time to score the sequence of major moves. If the teacher does not follow one of these five sequences then a score of zero points is given.

II Preliminary Moves

A. Statement of the Task - five (5) points

Any stating and demonstrating to the student what he will be able to do when the task is completed.

Acceptable statements:

a. "Everytime you see a figure like this, you will know that it's a hexagon." (Example is shown.)

b. "When we are finished, you will know what this shape is called." (Example is shown.)

Non-acceptable statements:

a. "You're going to learn about a new figure." (No example shown.)

b. "We're going to learn what a hexagon is." (No example shown.)

B. Assessing Motivational Readiness - five (5) points

Any statements or actions putting the child to a state of readiness to enter into the learning situation.

Acceptable statements:

a. "Are you ready?"

b. "Shall we start?"

Non-acceptable statements:

No statement made.

III Testing Prerequisite Skills

A. Name "Hexagon" - five (5) points

Any test of the student's ability to say the word 'hexagon'.

Acceptable statements:

a. "Can you say hexagon: Say after me - hexagon."

b. "Repeat after me - hexagon. It's pronounced hexagon."

Non-acceptable statements:

a. "Do you know how to say hexagon?" (Requires only a yes or no answer)

b. "Can you spell hexagon?"

B. Verbal Chain of Definition - five (5) points

Any test of the student's ability to say or repeat the definition.

Acceptable statements:

a. "Say after me - a hexagon is a six-sided figure."

b. "Can you say - a hexagon is a figure with six sides? Say it now."

Non-acceptable statements:

a. "A hexagon is a figure with six sides." (No repeat)

b. "Can you say - a hexagon is a hexagon is a six-sided figure?" (Requires only a yes or no answer)

C. Verbal Chain of the Rule five (5) points

Any test of the student's ability to say or repeat the rule.

Acceptable statements:

a. "If you count the sides and there are six, then it is a hexagon. Now you tell me."

b. "Can you say - this is a hexagon if I count the sides and find there are six? Say it."

Non-acceptable statements:

a. "If you count the sides and there are six, then it's a hexagon." (No repeat)

b. "Can you say - this is a hexagon if I find there are six sides?" (Answer is only yes or no)

D. Psycho-Motor Operation - five (5) points

Any test of the student's ability to demonstrate the motor operation. The student is asked if he can trace the figure stopping where he started.

Acceptable Statements:

a. "You take this figure and trace around the sides until you get to the place you started."

b. "Take your finger and trace completely around this figure one time."

Non-acceptable statements:

a. "Could you trace around this figure?" (Requires only a yes or no answer)

b. "When you trace around a figure, you stop at the same place that you started." (Does not require student to perform operation.)

E. Operation and Rule Together - five (5) points

Any test of the student's ability to say the rule and do the operation together.

Acceptable statements:

a. "Take this figure, count the sides, and say the rule."

b. "Show me how many sides this figure has and tell me how you know."

Non-acceptable statements:

a. "If you counted the sides, you would know what kind of figure it is." (Student not required to do it)

b. "Could you count the sides and tell me how you did it?" (Requires a yes or no answer)

IV Pre-testing Moves

There are five sections in this division of the rating sheet. The four sections to the right of the statements cover the initial test of the concept and the evaluation of the student's prerequisite knowledge of the concepts of six, side, and shape or figure. The column to the left side of the statements is for testing after teaching.

A. Initial Test of Concept

Any statements and/or actions to ascertain if the student can discriminate between examples and non-examples of hexagons.

Acceptable statements:

1. Teacher asks child to identify both an example and a non-example when given objects either singly or in a group. Score: five (5) points

a. "Here are some objects. Which one is a hexagon? Which one is not a hexagon?"

b. "How can you tell if this is a hexagon? How can you tell this is not a hexagon?"

2. Teacher asks child to identify an example but no non-example. Score: three (3) points

a. "What do we call this figure?"

b. "How can you tell this is a hexagon?"

Non-acceptable statements:

a. "Could you identify a hexagon?" (Requires only a yes or no answer)

b. "Tell me what a hexagon is." (Requires student to give a verbal definition.)

IV Pre-testing Moves (cont'd.)

B. Test Concept of Six

Any statements and actions to ascertain if the student can discriminate between example and non-example of six.

Acceptable statements:

1. Teacher asks child to identify both an example and a non-example when given objects either singly or in a group. Score: five (5) points

a. "Show me the pile of blocks that has six in it. Show me the pilo that does not have six blocks."

b. "How do you tell if there are six? Show me. How do you tell if there are not six?"

2. Teacher asks child to identify an example but no non-example. Score: three (3) points

a. "Show me the picture that has six balls."

b. "Give me six of those sticks."

Non-acceptable statements:

a. "Can you count to six?" (Requires yes or no answer)

b. "Do you know how much six is?" (Requires yes or no answer)

C. Test Concept of Side

Any statements and action to ascertain the student's ability to discriminate between an example and non-example of a side.

Acceptable statements:

1. Teacher asks child to identify both an example and a non-example when given objects singly or in a group. Score: five (5) points

a. "Can you show me what a side is on this? What is not a side?"

b. "Is this a side? What is not a side on this?"

2. Teacher asks child to identify an example but no non-example. Score: three (3) points

a. "Point to the sides of this box."

b. "Do you have a side? Show me where it is."

Non-acceptable statements:

a. "Do you know what a side is?" (Requires yes or no answer)

b. "Tell me what a side is." (Requires verbal difinition)

D. Test Concept of Shape or Figure

Any statement and action to ascertain the student's ability to demonstrate an example and non-example of shape or figure.

Acceptable statements:

1. Teacher asks child to identify both an example and a non-example when given objects either singly or in a group. Score: five (5) points

a. "What is the name of this shape? Does air have shape?"

b. "What is the name of this figure? Does a vacuum have any shape?"

2. Teacher asks child to identify an example but no non-example. Score: three (3) points

a. "What is the name of this figure?"

b. "What do we call this shape?"

Non-acceptable statements:

a. "Do you know what this figure is?" (Requires a yes or no answer)

b. "Tell me what we mean when we talked about shapes." (Requires a verbal definition)

V Teaching Moves

A.	Teacher has child or Teacher	construct, or trace, or point to sides	&	count, or write numbers	& teacher states definition.

Points are scored by: 1) completeness of move, i.e., if all parts of the move are used, including the definition statement, 2) number of sets of examples and non-examples used, i.e., if the teacher uses another set of examples to re-teach the concept, and 3) if the child or teacher does the constructing or tracing. A score of 5 points for First Example and First Non-Example is given if the teacher has the child do it with a score of 3 points for these two sections if the teacher does the work. A score of 2 points is given for the Second Example and the Second Non-Example if the teacher has the child do it with a score of 1 point for these two sections if the teacher does the work.

Acceptable statements:

Score: five (5) points for First Example, First Non-Example
two (2) points for Second Example, Second Non-Example

a. "Point to the sides while you count then and you will see there are six sides."

b. "Tell me if this is a hexagon after you trace around the sides and count them." (definition stated)

Score: three (3) points for First Example, First Non-Example
one (1) point for Second Example, Second Non-Example

a. ""I am going to point to the sides and count them to see if it's a hexagon with six sides."

b. "I'll trace the sides with my finger and we'll count them together to see if it's a hexagon with six sides."

Irregular Hexagon not credited as such - may be considered a second example.

Non-acceptable statements:

a. "Can you point to the sides and count them? Would you know what the figure is?" (Double question)

b. "By tracing around the sides, could you tell me what this figure is?" (Requires a yes or no answer)

VI Post-Test After Teaching

It is difficult to separate testing from teaching. Yet anytime a question is asked after being taught with the exception of the inductive teaching, it is scored in this section.

Acceptable statements:

1. Teacher asks child to identify both an example and a non-example when given objects either singly or in a group. Score: five (5) points

a. "Show me which one is a hexagon. Which one is not a hexagon."

b. "Pick out the figure that is a hexagon. Pick out a figure that is not a hexagon."

2. Teacher asks child to identify an example but no non-example. Score: three (3) points

a. "Find the hexagon in this group."

b. "Point to the one which is a hexagon."

3. Teacher asks child to identify second set of examples and non-examples. Score: three (3) points. May score as many times as it occurs.

a. "Show me another hexagon. Show me another one which is not a hexagon."

b. "Pick out another hexagon. Now pick out one which is not a hexagon."

4. Teacher asks child to identify only an example of the second set of example and non-example. Score: one (1) point.

a. "Find another hexagon in this group."

b. "Show me which one is a hexagon."

Non-acceptable statements:

a. "Do you know what a hexagon is?" (Requires a yes or no answer).

b. "Would you be able to find a hexagon in this group?" (Requires a yes or no answer)

Bonus and Demerits

Bonuses

First Bonus:

Teacher asks child to state rule while identifying. (How do you know?) Score: three (3) points

Acceptable statements:

a. "How do you find out if this is a hexagon?"

b. "If you just looked at this and you weren't sure, show and tell me how you would find out if it's a hexagon."

Non-acceptable statements:

a. "Would you be able to tell me how you know this is a hexagon?" (Requires a yes or no answer)

b. "Explain the method you would follow to determine if this figure is a hexagon." (Wording too difficult for student.)

Second bonus:

Teacher asks child to state definition while identifying. (Why is it?) Score two (2) points

Acceptable statements:

a. "Why is this figure a hexagon?"

b. "Why did you say this figure is a hexagon?"

Non-acceptable statements:

a. "Do you know why this is a hexagon." (Requires a yes or no answer)

b. "Give me the characteristics of this hexagon." (Wording too difficult for the student)

Third Bonus:

Teacher asks for child to say rule or definition rather than state it herself. (Inductive) Score: three (3) points

This bonus can be given on both First Example and First Non-Example.

Acceptable Statements:

a. "How could you always find out if a figure is a hexagon or not?"

b. "How could you find out if this figure is a hexagon?"

Non-acceptable Statements:

a. "Do you think you know how you could always tell if a figure is a hexagon?" (Requires yes or no answer)

b. "By what you've done, could you always tell how this is a hexagon?" (Requires yes or no answer)

Fourth bonus:

Teacher states rule instead of definition or asks question answered by rule instead of definition. Score: three (3) points

It must be the rule of how it is a hexagon, rather than just the definition. It can be scored on all 5 sections.

Acceptable statements:

a. "How will you know if this figure is a hexagon?"

b. "If you just looked at it and you weren't sure, show me how you would find out if it's a hexagon."

Non-acceptable statements:

a. "Do you know how to find out if a figure is a hexagon?" (Requires a yes or no answer)

b. "Evaluate the process you must follow to determine if this figure is a hexagon?" (Wording too difficult for the student)

Fifth bonus:

Teacher places one finger or a mark somewhere on object to anchor child's tracing. Score: three (3) points.

This score can be obtained for only the First Example.

Acceptable Statements:

a. "Hold your finger at this point and trace the sides with your other finger while counting."

b. "Hold one finger here while you count so you will know where to stop."

Sixth bonus:

Teacher asks any question which would result in child saying: Rule alone. Score: three (3) points

Acceptable statements:

a. "How would you find out if a figure is a hexagon?"

b. "How can you be sure that a figure is a hexagon?"

Non-acceptable statements:

a. "Do you know how to find out if a figure is a hexagon?" (Requires a yes or no answer)

b. "Evaluate the process you must follow to determine if this figure is a hexagon." (Wording too difficult for the student.)

Seventh Bonus:

Teacher asks any question which would result in child saying: Definition alone. Score: two (2) points

Acceptable statements:

a. "Tell me what a hexagon is."

b. "What is a hexagon?"

Non-acceptable statements:

a. "Could you tell me what a hexagon is?"

b. "You know what a hexagon is, don't you?"

Eighth Bonus:

Teacher asks any question which would result in child saying: Either name or attributes alone. Score: one (1) point

Acceptable statements:

a. "All hexagons have how many sides?"

b. "We call this figure a ________."

Non-acceptable statements:

a. "Spell hexagon."

b. "Do you know how many sides a hexagon has?" (Requires a yes or no answer)

First Demerit:

Teacher presents more than one object at a time without having taught the student where to start. Score: minus two (-2) points.

This demerit is given if the teacher gives more than one object at a time without having previously taught the student to start the operation with any figure.

The following three demerits are to be scored in relation to the above moves in the five sections of the Teaching Moves.

Second Demerit:

Teacher presents more than one object at a time. Score: minus two (-2) points.

If during the process of teaching the teacher presents more than one object at a time to the student, the demerit is given.

Third Demerit:

Teacher fails to have child state definition at least once. Score: minus three (-3) points during teaching.
minus two (-2) points during review.

The teacher is given these demerit points if she does not have the student state the definition at least once during the teaching process or at least once during the review.

Fourth Demerit:

Teacher fails to have child state rule at least once.
Score: minus three (-3) points during teaching.
minus two (-2) points during review.

The teacher is given these demerit points if she does not have the student state the rule at least once during the teaching process or at least once during the review.

The final section of the check sheet is separate from Teaching Moves in that it is scored at appropriate times throughout the entire session. They are bonus points which can be awarded when they occur at any part of the session up to five times. These points are given when the teacher states the rule, definition, or name or attributes. The teacher, in this case, does not have to ask the student to give the rule, definition, or name or attributes.

Teacher simply states with or without objects:

Rule: Score: Three (3) points

Definition: Score: Two (2) points

Name or attributes: Score: one (1) point

VII Review:; Teach After Test

This section is scored only after Teaching Moves and Post-Testing have been done. The statements can be checked more than once in this column since it is a recycling and review process.

Appendix C

TEST AFTER VIDEO-TAPED TEACHING SESSION

A. Question: Place an example on the table before the student and ask: "Do you know what this object is called?"

Correct Answer: Hexagon.

Teacher Response: If the child either says or does not say hexagon, the teacher says or does nothing to indicate he is correct or incorrect.

B. Let the example remain on the table.

Question: "How can you tell if this is a hexagon" Show me and tell me."

Correct Answer: Showing - by pointing to the sides and counting the student makes the decision that it is a hexagon.

Telling - by talking through the movements the student makes the decision that it is a hexagon.

Teacher Response: The teacher does not tell or show the student if he is correct or incorrect.

C. Place a non-example on the table before the student.

Question: "Is this a hexagon?"

Correct Answer: No.

Teacher Response: The teacher says or does noting to indicate if he is correct or incorrect.

D. Question: "How do you know this is not a hexagon? Show me and tell me."

APPENDIX D
STATEMENT OF INTENT

Instructions for the Teacher

(This form was presented to teachers
24 hours prior to video-tape session.)

You are to teach the concept Hexagon to one child for a 5 minute period. There will be no additional time for "warm-up" with the child but you may use part of the time for this purpose, if you wish.

After a brief break you will teach the concept to a second child for an additional 5 minute maximum period.

You will then be able to review the playback of the two tapes and comment briefly on them.

The first child will be a 9 year old with an I.Q. approximately 70-80.
The second child will be a 6 year old with an I.Q. approximately 100.
Thus the two children will have M.A.'s of about 6+ years.

Please complete the following form:

Name ____________________ Present Occupation ______________

Highest educational degree ____ Where obtained ________ When ___

Total number of years of teaching experience ______

Number of units of courses in special education ________

Number of units in special education beyond the B.A. _____

Have you taken a Methods course? _____ (date)

Have you taken a Methods course in Special Education _______ (date)

Briefly jot down what you intend to do in this taping session:

I give my permission to the Educational Psychology Department to use this video tape for teaching or research purposes.

Signed ______________________

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